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Research Activities

of THE BUREAU OF PLANT INDUSTRY, SOILS,
AND AGRICULTURAL ENGINEERING.

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U. S. DEPARTMENT OF AGRICULTURE
BELTSVILLE BRANCH

Plant Industry Station, Beltsville, Md.

February 1953

As an indication of increasing "grass roots" interest in crops and soils research, Bureau Chief A.H. Moseman notes that:

(1) Members of the research committee of the National Association of Wheat Growers are making a real effort to keep well informed on research in progress in USDA and the States. In Omaha, Neb., late in January to speak at the annual meeting of the Association, Dr. Moseman was invited to meet with the research committee and review wheat problems that call for immediate research attention.

(2) The National Association of Soil Conservation Districts, meeting in Omaha a few days after the NAWG, passed a resolution setting up committees at State and area levels to work with technical people in evaluating the research needed to carry on conservation activities more effectively.

(Mimeographed copies of Dr. Moseman's speech, THE TIME FOR RESEARCH may be obtained from the Information Division, Plant Industry Station.)

Martin G. Weiss began his new duties as Research Director of Field Crops, Feb. 16. Filling the post left vacant by the resignation of W.M. Myers in June, Dr. Weiss will have broad responsibilities in planning, co-ordinating, and management of activities conducted by Divisions concerned with research in cereals, cotton, forage, rubber plants, sugar plants, tobacco, and weed investigations. He will also continue to direct soybean improvement investigations of which he has been in charge since 1950.

Dr. Weiss joined the Bureau as a junior geneticist at Ames, Iowa in 1936. He holds a BSA, an MS, and a PhD from Iowa State where he served on the faculty from 1946 to 1950.





During the next five months Omer J. Kelley, head of the new Division of Soil Management--Irrigation and Dry Land Regions, will be traveling through the 17 Western States, directing a detailed review of research in progress at the field locations. A similar review is being made in the Eastern half of the country by R.Q. Parks and his associates in the Division of Soil Management for the Humid Regions.

In each region the Division head plans to visit the field locations recently transferred from SCS and as many of the field locations originally set up by the Bureau as their travel schedules will permit. The review is designed to enable them to plan possible needed adjustments in the research program. Staff members from the cooperating State experiment stations and the project leaders are participating in this program review.

Dr. Kelley, who joined the Bureau in 1942 as a soil technologist in the guayule project, has been in charge of the Bureau's cooperative soil management program in the irrigated areas of the Western States since 1946. He is a graduate of Colorado A.& M. College and holds a doctorate from Ohio State.

Maurice L. (Duke) DuMars, formerly Deputy Director of the USDA Office of Information has joined the Bureau to serve as a special assistant to the Chief in work with the Soil Conservation Service.

The position, a new one jointly financed by the two agencies, has been set up to facilitate "the establishment of special procedures for insuring that research in this field--soil and crop management and water management on farms related to crop production--reflects the problems of farmers and that research findings are rapidly applied to those problems." (Secretary's Memorandum No. 1318.)

Mr. DuMars' immediate responsibility is to work out plans for making research findings from throughout the Bureau quickly available to farm planners and other SCS workers across the country.

Mr. DuMars is a native of Kansas and a graduate in journalism from Kansas State College. After working as a newspaper reporter and assistant extension editor in Kansas, he joined USDA as an information specialist for AAA. In 1941 he transferred to Radio Service in the Office of Information. He served as Administrative Officer to the Secretary of Agriculture from 1946 until he became Deputy Administrator of Information in 1951.



Among recent research contributions described by F.P. Cullinan, Assistant Chief in a talk before the Maryland Nurserymen's Association, January 8, was an effective formula for the control of weeds, including crabgrass, in lawns and turf.

Developed in evaluation studies by Warren Shaw (WI) and Alexander Radko (USGA), the formula combines PMA (phenyl mercuric acetate) and 2,4-D. The rate per acre is one-half pound of PMA to one pound of 2,4-D applied at monthly intervals early in June, July, and August. The two compounds were more effective in destroying weeds when used together than when either was used alone. (Mimeographed copies of Dr. Cullinan's talk are available from the Division of Information, BPISAE.)

New knowledge of the way plants absorb and translocate organic compounds is beginning to show the way for more effective uses of these compounds in plant disease control, J.W. Mitchell (Horticulture) told the Bureau Seminar in January. The discovery by Dr. Mitchell and his associates that antibiotics such as streptomycin are absorbed by leaves and stems and translocated from one part of the plant to another has stimulated extensive research on this problem. Among interesting developments reported by Dr. Mitchell at the Seminar is the finding that of the four isometric forms of chloromycetin, the only one affecting the growth of plants is also the only one used in the control of diseases in human beings.

Studies with radioactive tracers have shown that even closely related chemical compounds are translocated and absorbed at different rates and accumulate in different parts of the plant. Some compounds are translocated mainly in an upward direction while others move both upward and downward in the plant. In a recent investigation Dr. Mitchell found that one plant growth modifying substance can be used to control the direction in which a plant translocates another growth modifying compound. In this instance indolacetic acid caused radioactive 2,4-D --applied to the leaves-- to be translocated and to accumulate in the stem area where the indolacetic acid was applied.

A better understanding of the selective process in plant roots is the objective of research by Emanuel Epstein and Cal E. Hagan of the Soil and Plant Biochemistry Laboratory. Reporting on recent findings in studies of the selective mechanism of barley roots at the Bureau seminar for December, Dr. Epstein described their concept of the selective nature of the absorption process.

On the basis of experiments with radioisotopes of various elements--notably sodium and potassium, Dr. Epstein and Dr. Hagan theorize that there are "carrier" molecules in the root cells. These "bind" the ions at the outer surface, "escort" them across a membrane, and "dump" them into the interior of the cell. The carriers have a number of binding sites for ions of different elements and there is evidence that elements similar chemically tend to be bound by the same binding sites. Potassium, rubidium, and cesium are bound by identical sites; sodium and lithium by different sites. Among the anions the binding sites are identical for chloride, bromide, and iodide. Nitrate is held at a different site.

Current emphasis in chestnut breeding is on varieties adapted to the central and northern parts of the country, according to J.W.McKay (F&NC&D). Reviewing recent developments in nut breeding research before the February Bureau seminar, Dr. McKay said the goal is to obtain improved varieties that (1) require a shorter growth season than any now available; (2) have good keeping qualities--in chestnuts, ability to store well is a varietal character; and (3) are true breeding strains. The third point is considered one of the keys to rapid orchard improvement. Today's seedlings, which form the basis of commercial chestnut production, show great variability in vigor and yields. Recent studies indicate that it is possible to select parent seed trees that will give fairly uniform progeny.

The resignation of Fred V. Grau, director of cooperative turf research for the U.S. Golf Association and the Bureau, became effective February 15. Dr. Grau, who began his studies of turf improvement in the late '20's while a student at the University of Nebraska on a fellowship from USGA, has been in his present post since 1945. Prior to that he served for 10 years as Extension agronomist in Pennsylvania. He earned his doctorate at the University of Maryland. In the cooperative work at Plant Industry Station and in Bureau field locations Dr. Grau's major contributions have been in improved zoysijs and other grasses for turf uses. He is chairman of the turf committee of the American Society of Agronomy.

Four graduate students of the University of Maryland are doing research in the Bureau under fellowships set up by societies in the floriculture industry. Phil Price and Dave Shindler hold the fellowships established by Roses Incorporated. Mr. Price is crossing standard varieties and studying methods of improved rose seed germination. Mr. Shindler is investigating the problem of nematodes in rose culture. Bob Jenkins, who holds the American Rose Society fellowship is evaluating rose species and varieties for resistance to blackspot. On a fellowship granted by the Society of American Florists and Ornamental Horticulturists, Roger Milstrey is working on carnation diseases. The American Carnation Society has set up a \$1,500 annual fellowship to be awarded for the first time this coming year.

Statistically speaking - Some 3,800 men and women spent from several hours to several days taking a look at research in progress and conferring with scientists at Plant Industry Station in 1952, according to John H. Martin, who is in charge of visitors to the Bureau. Not quite half (1,554) were foreign technicians. The remainder were U.S. citizens and represented various groups with special interests in crops and soils research. Largest number of visitors (173 foreign and 410 domestic) came to the Station in June. Fewest (33 foreign and 64 domestic) made their visits in January.

The past year was a fairly productive one in terms of articles reporting Bureau research progress in scientific journals and for scientific meetings. A round-up shows there were 1,294 papers. Of these 216 were for presentation at meetings; 793 were for publication only; and 285 for both presentation and publication. Field crop researchers led the list with 508 manuscripts. Most of these (142) were in cereal crops. Forage crops writers were second with 113. Scientists in fruit and nut crop investigations led all other divisions in horticultural research with 153 papers. Total for horticultural crops was 427. Of the 200 papers written on soils research, 155 were prepared by works in soil management and irrigation. Writers on farm machinery problems turned out 47 of the 135 papers prepared by agricultural engineers.

In taking over responsibilities for US technical assistance program related to Bureau work, O.S. Aamodt has spent the first month in evaluating line projects that are being set up under TCA in countries around the world.

In his new position, Dr. Aamodt, long-time leader of alfalfa investigations and former head of the Division of Forage Crops and Diseases, will represent the Chief of the Bureau in various conferences and meetings sponsored by TCA and related to crop research problems in foreign countries.

Hugo O. Graumann has transferred to Plant Industry Station from Lincoln, Neb., to serve as leader of the alfalfa improvement investigations.

A member of the Bureau staff since 1947, Dr. Graumann has conducted studies in alfalfa breeding at the University of Nebraska for the past five years. He is a native of Oklahoma, a graduate and former faculty member of Oklahoma A.& M. College. He holds a doctorate from the University of Nebraska. Dr. Graumann was secretary of the Oklahoma Crop Improvement Association from 1942 to 1944.

Since reporting to Beltsville, January 1, as leader of the grass improvement project, Angus O. Hanson has attended meetings of two forage crop technical committees--the Northeastern in New York, N.Y., and the North-central in Ames, Iowa.

Dr. Hanson comes to the new post from State College, Pa., where he has been doing work in the cytogenetics of grasses at the U.S. Pasture Laboratory. He is a Canadian with a BSA from the University of British Columbia, an MSc from McGill, and a PhD from Pennsylvania State College. On his new assignment Dr. Hanson heads the research on breeding and development of superior grasses for hay, silage, and pasture use.

Awards have recently been received by three Bureau scientists. T.W. Whitaker, geneticist at the U.S. Field Laboratory, La Jolla, Calif., will use \$1,000 he received from the American Academy of Arts and Sciences for further research on cucurbits. The award was granted in recognition of his research in the genetics, development, history, and origin of cultivated cucurbits. Dr. Whitaker held a Guggenheim Fellowship in 1947.

Ralph M. Lindgren (FP) has recently been chosen for an outstanding achievement award granted by the University of Minnesota to former students who attain high eminence and distinction.

G.F. Potter (F&NC&D) has been awarded the Wilder medal by the American Pomological Society in recognition of his research in tung. The Society also awarded a Wilder medal to USDA for the origination of meritorious varieties of peaches.

Andy J. Feeney, for the past two and a half years an associate editor of the DAKOTA FARMER, has joined the Information Division as a publications writer. Mr. Feeney holds a bachelor's degree in agricultural journalism from South Dakota State College.



Fifty years ago this month in Terrell, Texas, Seaman A. Knapp, a Bureau employee, inaugurated a plan that became the nucleus of cooperative extension work. This was a community centered, farm-conducted farm demonstration. The occasion was observed February 26 by a special ceremony in Terrell, a commemorative program in USDA and many of the Land-Grant colleges.

New Varieties

Foundation seed of Badger Market, a new cabbage, has been released to seedsmen for increase. A product of cooperative research by the Wisconsin Station and the Bureau, the new variety is designed to meet the market need for a second early round head cabbage. The compact round heads of Badger Market are smaller than those of either parent variety--Racine Market and Globe. The new cabbage is resistant to yellows and carries moderate resistance to mosaic.

Burley 2 tobacco has been released in cooperation with the Tennessee Experiment Station. Since an outstanding character of this new variety is ability to hold bottom leaves, it is especially recommended for production on soils where Burley 1 and other thin bodied types fire excessively. Burley 2 is easy to grow, ripens uniformly, and produces high yields of good quality leaf under a wide range of soil conditions. The Tennessee tests with the new variety averaged 2.2 percent more cigarette grade leaf than other similar varieties. The new variety carries resistance only to black root rot.

Clintafe an oat, developed in cooperation with the Iowa Station, has been released in Iowa and nearby States. The new variety comes from a back-cross between Clinton and Santa Fe, an Argentine variety. Clinton was used twice in back-crossing to produce it. Clintafe more closely resembles Clinton than it does Santa Fe. It is superior to Clinton in that it is resistant to races of crown rust now prevalent in the United States. It is also resistant to *Helminthosporium* blight and has more tolerance than most varieties to *Septoria* black stem. Slightly variable in both height and maturity, Clintafe is about 2 inches taller and matures 2 days later than Clinton. Average yields in 3-year tests in Iowa have been 70 bushels an acre for Clintafe, 68 for Shelby, and 62 for Clinton.